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438,153

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Complete Specification Accepted: Nov. 12, 1935.

PROVISIONAL SPECIFICATION

Improved Construction of Compressed Air Engines

We, WILLIAM THOMAS BELL, "Hill-side," South Park, Lincoln, and ARTHUR JOHNSTONE, 104, Yarborough Road, Lincoln, both British Subjects, do hereby

5 declare the nature of this invention to be as follows:—

The object of this invention is to construct a compressed air engine in an improved manner.

10 For the purpose of this invention, the engine is constructed with any number not less than three fixed cylinders radially arranged with the piston rods and cranks outwardly, the shaft of each crank carrying a gear wheel, and each gear wheel or

15 each pair of gear wheels meshing with an idle gear wheel, which in turn mesh with a gear wheel on the driven shaft, the crank shafts and gear wheels being mounted in bearings of a frame or casing. The cylinders have inlets at their base and are mounted on a tubular block provided with passageways leading to the inlet ports of each cylinder, and the

20 entrance to such passageways are preferably curved in opposite directions to form a lead in to the passageways. The exhaust ports of each cylinder are formed in the sides of the cylinders and opened just as the piston is reaching the end of its outer stroke. Within the block is mounted a slotted sleeve having contact with the inner surface of the block, the slots corresponding

35 with the number of cylinders, and the portion between each slot is sufficient to completely close the entrance to the passageways and such sleeve is actuable by hand from outside by any suitable

40 mechanism.

Inside the sleeve is positioned a tubular valve having an inlet and two outlets,

and revolvable by suitable mechanism, the outlets being opposite each other and of a size to be closed when positioned next to the portion between each slot in the sleeve, the inlet being central from one end which is connected to or communicates with the compressed air supply.

The driven shaft is in axial line with the valve, and is supported in suitable bearings preferably of the frame or housing, and such shaft is provided with or connected to any operative mechanism.

The pistons, if six be employed, are operated in pairs with the crank shafts in different directions, and each pair of pistons are moved by the fluid, the cylinders exhausted and the pistons returned at each half revolution of the valve.

To reverse the sleeve, the fluid supply is cut off and the sleeve is revolved to position slots next the passageways of the inlets of the next cylinder, when by reason of the position of the pistons, a reverse action will take place on re-establishing the fluid supply.

By this construction of compressed air engine, the cylinders are radially arranged with the cranks outwards, the cranks shafts have a gear wheel meshing with an idle gear wheel, which in turn meshes with a gear wheel on the driven shaft, the cylinders are controlled by a single rotary valve, and reversal is effected by a sleeve positioned between the valve and the inlet ports of the cylinder, the cylinders being open ended and the sides provided with exhaust ports.

Dated this 21st day of July, 1934.

H. GARDNER & SON,
Chartered Patent Agents,
173—4—5, Fleet Street, London, E.C.4.
Agents for the said Applicants.

COMPLETE SPECIFICATION

Improved Construction of Compressed Air Engines

80 We, WILLIAM THOMAS BELL, of "Hill-side," South Park, Lincoln, and ARTHUR JOHNSTONE, of 104, Yarborough Road, Lincoln, both British Subjects, do hereby declare the nature of this invention and in what manner the same is to be performed.
[Price 1/-]

formed, to be particularly described and ascertained in and by the following statement:—

The object of this invention is to construct a compressed air engine in an improved manner.

For the purpose of this invention, a compressed air engine is constructed from a multiple of open ended cylinders, not less than three, having exhaust ports 5 formed in the side and mounted radially on a tubular block having passageways connecting each cylinder, a single rotary valve within the block controlling the fluid supply to the cylinders, a slotted 10 sleeve operable by hand and positioned within the block and concentric with the valve and controlling the passageways to the cylinders for reversing the engine, the pistons having their rods and crank shafts 15 outwardly arranged with a gear wheel on each crank shaft meshing with idle gear wheels which in turn mesh with a gear wheel on the driven shaft, the driven shaft and valve being in alignment, the 20 whole being mounted in a frame or casing.

The invention will be clearly understood from the following description aided by the accompanying drawings which illustrate a six cylinder engine.

25 Figure 1 is a sectional end view.

Figure 2 a part sectional side view.

Figure 3 a sectional view of the valve and block with the sleeve in position for admitting compressed air to one set of 30 cylinders, and Figure 4 is a similar view to Figure 3 with the sleeve positioned to admit compressed air to the other set of cylinders. The engine is constructed with any number, not less than three, fixed 35 open ended cylinders, (in the drawings six are shown) radially arranged with the piston rods and cranks 3 outwardly positioned, the shaft 4 of each crank 3 carrying a gear wheel 5, and each gear wheel 5 40 or each pair of gear wheels 5 meshing with an idle gear wheel 6, which in turn mesh with a gear wheel 7 on the driven shaft 8, the crank shafts 4 and gear wheels 5 being mounted in bearings 9 of a frame 45 or casing 10.

The cylinders 1 are mounted on a tubular block 11 provided with passageways 12 leading to each cylinder, and the entrances to such passageways are preferably curved 50 as at 13 in opposite directions to form a lead in to the passageways 12. The exhaust ports 14 of each cylinder 1 are formed in the sides of the cylinders 1 and opened just as the piston 15 is reaching 55 the end of its outer stroke.

Within the block 11, and between it and a fixed tubular portion 16 having slots 17 positioned with the slots 17 between the passageways 12, is mounted a sleeve 60 18 having slots 19, the slots corresponding with the number of cylinders, and the portion between each slot 19 is sufficient to completely close the entrance to the passageways 12, and such sleeve is 65 actuable by hand from outside by any

suitable mechanism, such as by a hand lever 20 secured to the sleeve 18.

Inside the tubular portion 16 is positioned a tubular valve 21 having an inlet 70 and two outlets, and revoluble by being attached to the shaft 8, the outlets 22, 23 being opposite each other and of a size to be closed when positioned next to the portion between each slot 17 in the tubular 75 portion 16, the inlet 24 being central from one end which is connected to or communicates with the compressed air supply.

The driven shaft 8 is in axial line with the valve 21, and is supported in suitable bearings 25 preferably of the frame or 80 housing 10, and such shaft 8 is provided with or connected to any operative mechanism.

The pistons, if six be employed as shown, are operated in pairs with the 85 crank shafts 3 in different directions, and each pair of pistons 15 are moved by the fluid, the cylinders 1 exhausted and the pistons 15 returned at each half revolution of the valve 21. 90

To reverse the engine, the fluid supply is cut off and the sleeve 18 is revolved to position its slots 19 next the passageways 95 of the inlets of the next cylinder, when by reason of the position of the pistons, a reverse action will take place on re-establishing the fluid supply, as will be understood from Figures 3 and 4.

By this construction of compressed air engine, the cylinders 1 are radially arranged with the cranks 3 outwards, the 100 cranks shafts have a gear wheel 5 meshing with an idle gear wheel 6, which in turn meshes with a gear wheel 7 on the driven shaft 8, the cylinders 1 are controlled by a single rotary valve 21, and 105 reversal is effected by a sleeve positioned within the block 11 and between the valve and the inlet ports of the cylinders, the cylinders 1 being open ended and the sides 110 provided with exhaust ports 14.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we 115 claim is:—

1. A compressed air engine constructed from a multiple of open ended cylinders, not less than three, having exhaust ports 120 formed in the side and mounted radially on a tubular block having passageways connecting each cylinder, a single rotary valve within the block controlling the fluid supply to the cylinders, a slotted sleeve operable by hand and positioned 125 within the block and concentric with the valve and controlling the passageways to the cylinders for reversing the engine, the pistons having their rods and crank shafts outwardly arranged with a gear wheel on 130

each crank shaft meshing with idle gear wheels which in turn mesh with a gear wheel on the driven shaft, the driven shaft and valve being in alignment, the whole being mounted in a frame or casing.

2. In a compressed air engine as claimed in Claim 1, forming the entrances to the passageways of the cylinders curved in opposite directions on each side and the slotted sleeve with the solid portions between the slots of a width to close such entrances and open the next

adjoining entrances when moved for reversal of the engine, substantially as set forth.

3. A compressed air engine, constructed substantially as described and as shown on the annexed drawings.

Dated this 19th day of July, 1935.

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Agents for the said Applicants.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

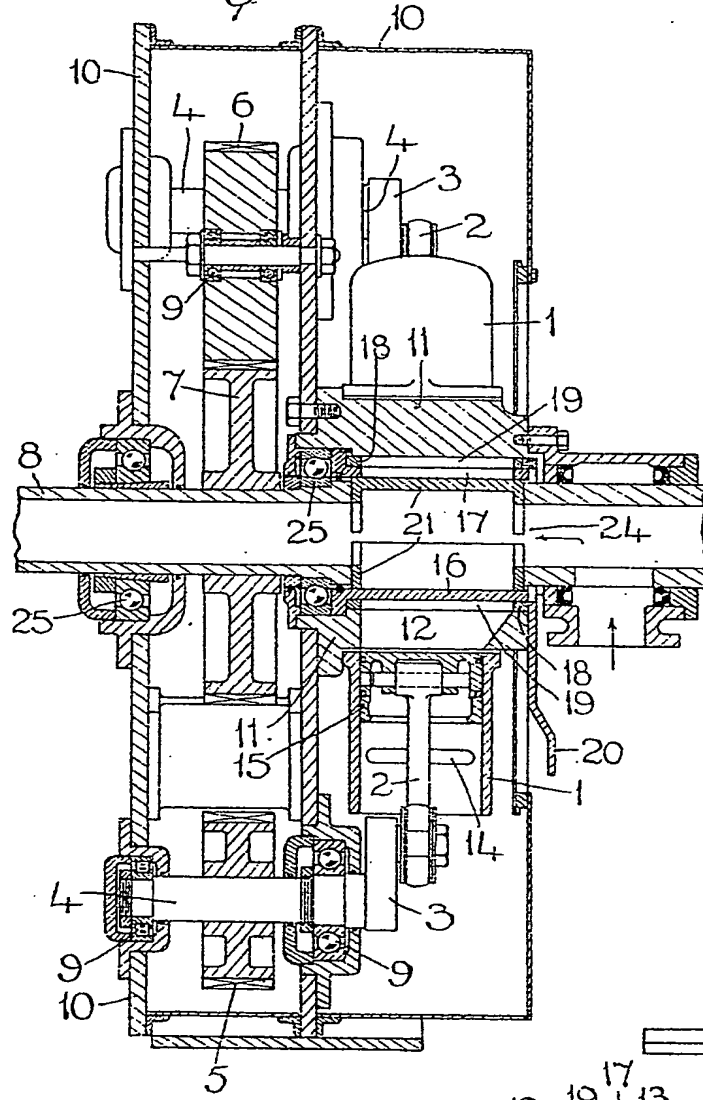


Fig. 2.

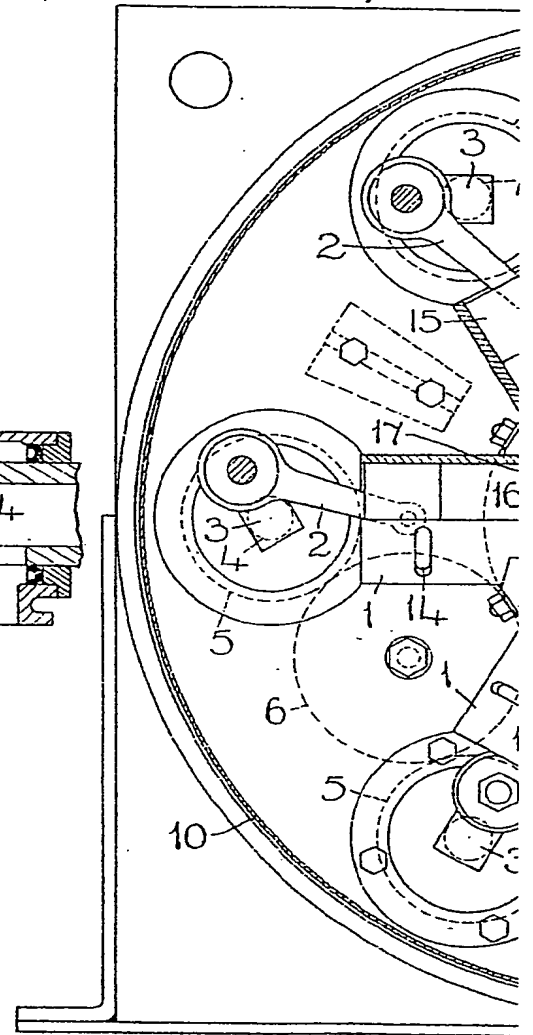


Fig. 3.

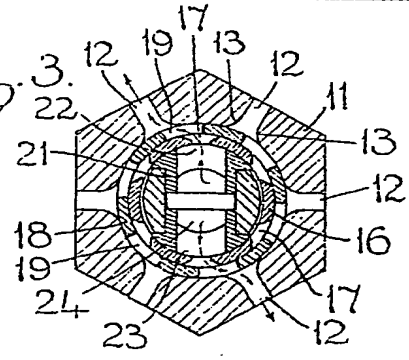


Fig. 4.

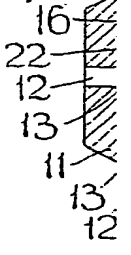


Fig. 2.

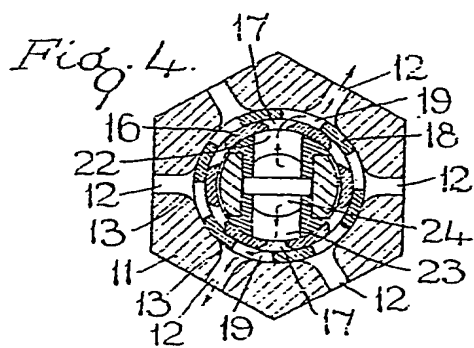
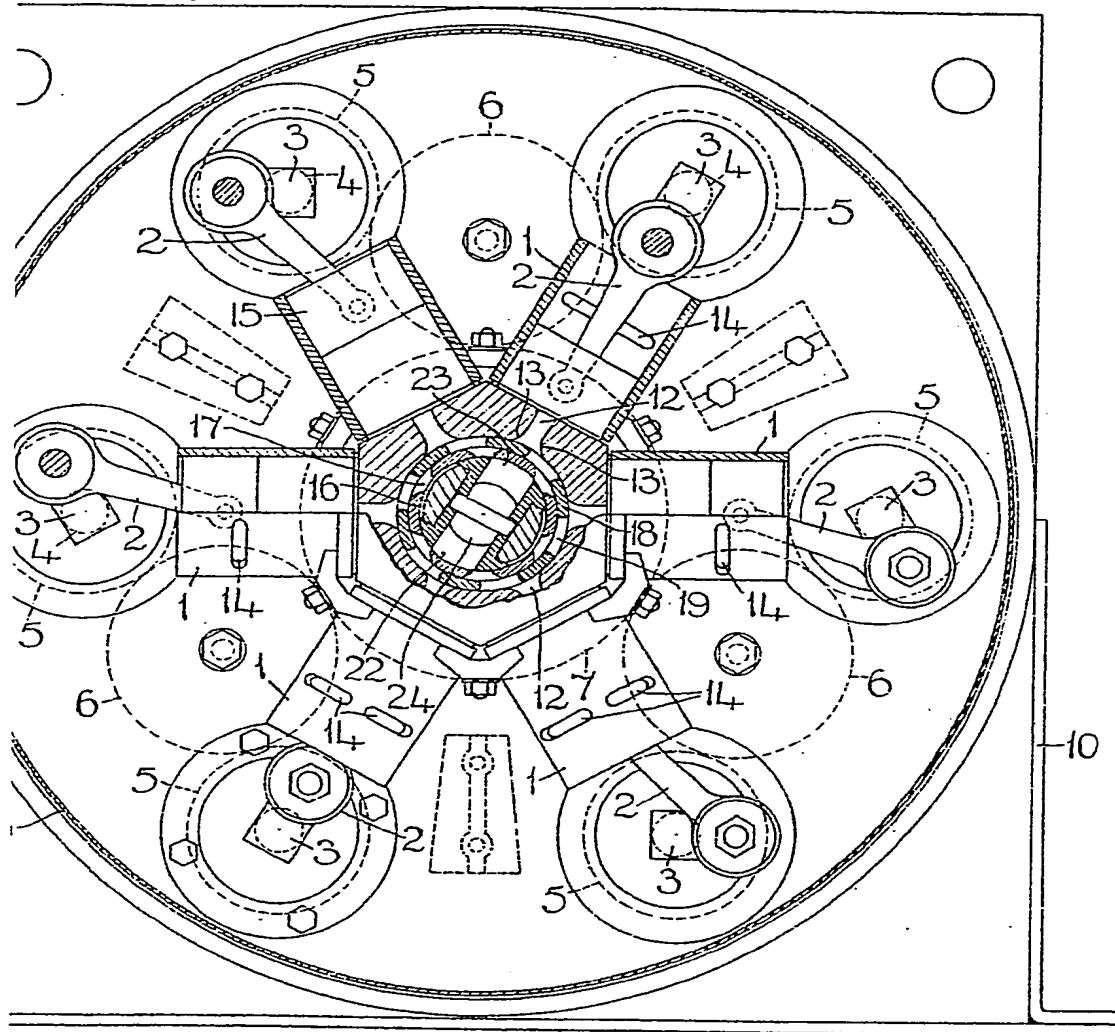


Fig. 1.

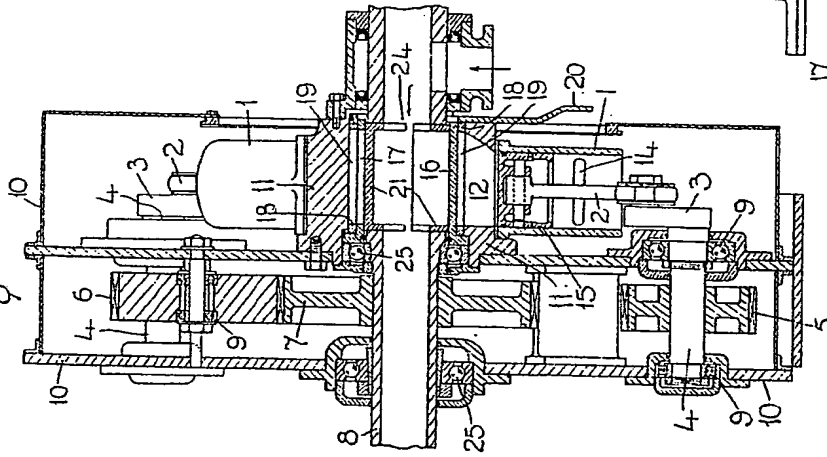


Fig. 2.

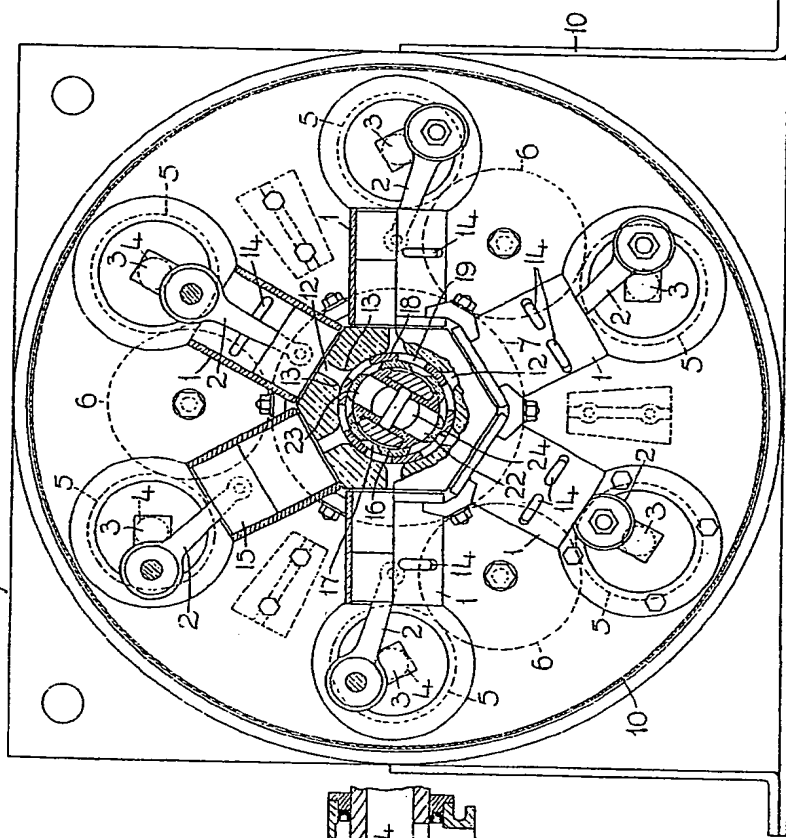


Fig. 3.

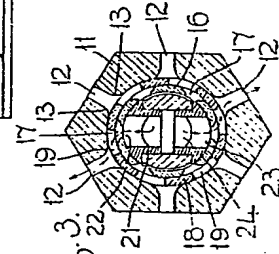
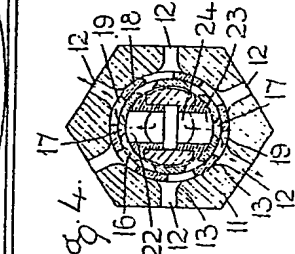


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale]

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